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Dated: June 17, 2010
Electronic Signature for Anthony A. Laurentano: /Anthony A. Laurentano/

Docket No.: TOW-051RCE3
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Seiji Sugiura *et al.*

Application No.: 10/721,616 Confirmation No.: 5616

Filed: November 24, 2003 Art Unit: 1795

For: FUEL CELL Examiner: B. Lewis

ARGUMENTS FOR PRE-APPEAL BRIEF REQUEST FOR REVIEW

MS AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

The following is submitted together with a Notice of Appeal under 37 C.F.R. §41.31 and in support of a Pre-Appeal Brief Request for Review in the above-identified Application.

Claims 1, 2, 5, and 6 are pending in the application, of which claim 1 is independent. Claims 1, 2, 5, and 6 stand rejected under 35 U.S.C. §103(a) as being obvious over U.S. Patent No. 6,403,247 to Guthrie in view of U.S. Patent Publication No. 2001/0033954 to Gyoten. Applicants respectfully traverse the outstanding rejections.

The present application is generally directed to a fuel cell system. In traditional fuel cells, a coolant flow field connects a coolant inlet with a coolant outlet. Problematically, air can pass into the coolant flow field along with the coolant fluid, and the air collects at the top of the coolant flow field. Because the top of the coolant flow field is taken up by air instead of coolant, the top of the fuel cell is not cooled efficiently.

The present application solves this problem by provided an air-releasing passage at a particular location in the fuel cell. The air releasing passage is formed at an upper position of the end of the separator opposite the coolant inlet, and is provided above (and is aligned with) the coolant discharge passage. The coolant supply passage and the coolant discharge passage

are each provided at a middle portion of the separator, at opposite vertical ends.

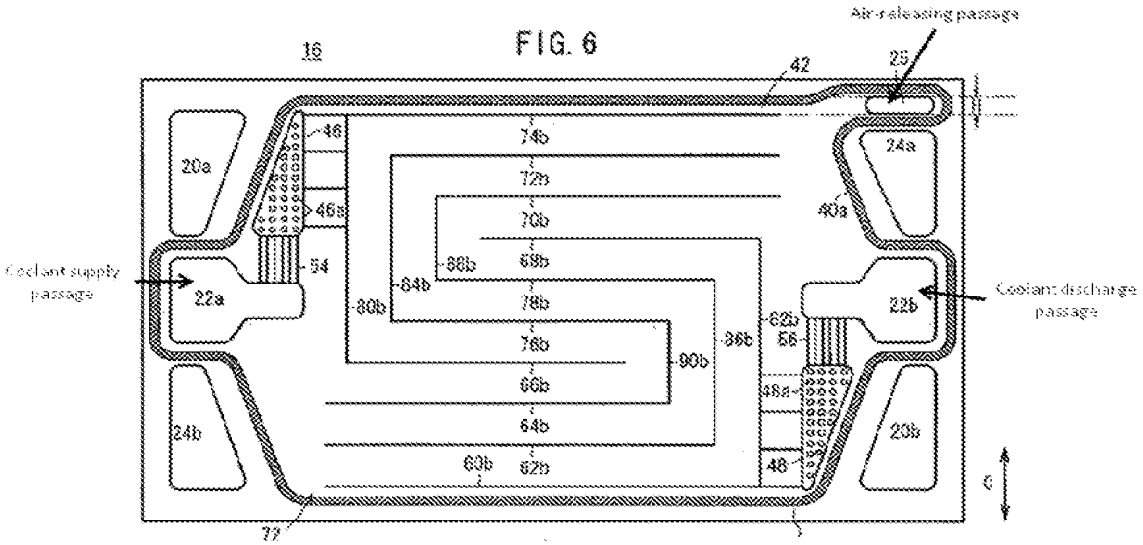

Figure 6 of the Present Application

In this manner, the air contained within the coolant flow field is reliably discharged from the coolant flow field through the air-releasing passage, thereby preventing the air from being trapped in the coolant flow field. Thus, the coolant is supplied to substantially the entire surface of the coolant flow field, and the cooling efficiency of the fuel cell is improved dramatically. Furthermore, the air-releasing passage is provided above (and aligned with) the coolant discharge passage. Since the air in the coolant flow field moves upwardly to the air-releasing passage while the coolant is flowing toward the coolant discharge passage, the air is reliably discharged into the air-releasing passage.

Accordingly, independent claim 1 recites, among other things:

1. *A fuel cell ...*

wherein a reactant gas supply passage, a reactant gas discharge passage, a coolant supply passage, and a coolant discharge passage extend through said fuel cell in a stacking direction of said fuel cell;

a coolant flow field is formed along a surface of said separator and ... connects said coolant supply passage to said coolant discharge passage;

said coolant supply passage is provided at a middle position of one vertical end of said separator, and said coolant discharge passage is provided at a middle position of the other vertical end of said separator; and

an air-releasing passage connected to said coolant flow field for releasing air from said coolant flow field is formed at an upper position of the other vertical end of said separator such that at least part of said air-releasing passage is positioned above a top of said coolant flow field, ...

wherein said air-releasing passage is positioned above said coolant discharge passage at the other vertical end of the separator, wherein the air-releasing passage is aligned with the coolant discharge passage on the same side of the separator as the coolant discharge passage is positioned.

Applicants respectfully submit that Guthrie and Gyoten, alone or in any reasonable combination, do not disclose or suggest at least *a coolant supply passage provided at a middle position of one vertical end of said separator, and a coolant discharge passage provided at a middle position of the other vertical end of said separator*, wherein *the air-releasing passage is aligned with the coolant discharge passage on the same side of the separator as the coolant discharge passage is positioned*, as recited in claim 1.

The Examiner does not allege that Gyoten teaches these features of claim 1; instead, Gyoten is relied upon only for metallic separator plates (Office Action at page 5). Indeed, Gyoten is silent with respect to the above-quoted features of claim 1.

Guthrie depicts a fuel cell having a coolant gas vent 742 provided alongside the fuel inlet manifold and fuel outlet manifold. The Examiner interprets this coolant gas vent 742 as the "air-releasing passage" of the present application. However, Guthrie's separator configuration is entirely different from the configuration recited in claim 1:

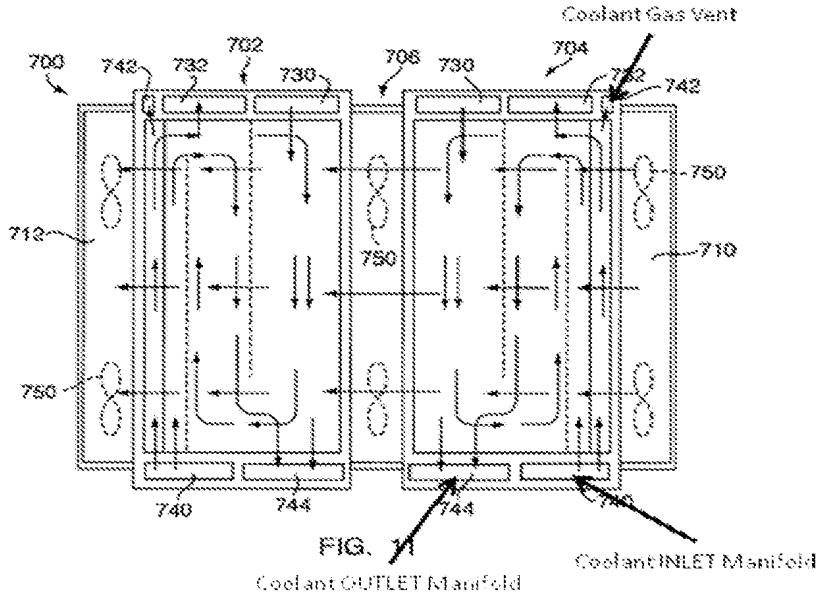

Figure 11 of Guthrie

Although there are numerous differences between Guthrie and claim 1, Applicants focus herein on four distinctions:

1) Claim 1 recites that *a coolant supply passage provided at a middle position of one vertical end of said separator*; Guthrie's coolant inlet manifold (supply passage) is at the right side of a horizontal end of the separator.

2) Claim 1 recites *a coolant discharge passage provided at a middle position of the other vertical end of said separator*; Guthrie's coolant outlet manifold (discharge passage) is provided at the left side of the same horizontal end of the separator as the inlet manifold.

3) Claim 1 recites that *the air-releasing passage is aligned with the coolant discharge* passage; Guthrie's gas vent (air-releasing passage) is provided at the opposite corner of the separator from the coolant outlet manifold.

4) Claim 1 recites that the air releasing passage is positioned *on the same side of the separator as the coolant discharge passage*; Guthrie's air releasing passage is positioned on the opposite side of the separator from the coolant discharge passage.

The Examiner does not attempt to assert that Guthrie discloses or suggests these features of claim 1. Rather, the Examiner asserts that these features "solve no stated problem and would be an obvious matter of design choice" (Office Action at pages 4-5).

Applicants respectfully disagree that the recited features solve no technical problem and would have been an obvious design choice. For example, because the air releasing passage is aligned with the coolant discharge passage on the same side of the separator in the claimed invention, the air in the coolant is carried across the separator by the coolant as the coolant moves towards the coolant discharge passage. This allows most of the air to be reliably discharged from the coolant flow field, because the air is both encouraged upwards (due to the air being lighter than the coolant) and towards the appropriate end of the separator (due to the motion of the coolant). This feature is described in the Specification at pages 5-6.

As can be seen in Figure 11 of Guthrie, because the gas vent is not aligned with the outlet manifold, the flow of the coolant does not encourage the air trapped on the upper left side of Guthrie's coolant flow field towards the vent. Rather, the flow of the coolant encourages the air away from the vent, preventing a reliable discharge of trapped air.

Moreover, because the coolant supply and discharge passages of the present Application are provided at a middle of the separator, the fuel gas and oxidant inlet/outlet passages can be provided at the top and bottom of the separator (as recited, for example, in claim 6). By providing the fuel gas and oxidant outlet passages at the bottom of the separator and the inlet passages at the top of the separator, the water generated in the reaction of the oxidant gas with the fuel gas naturally makes its way to the bottom of the separator and is removed through the fuel gas/oxidant gas outlet passages, as described in the specification at page 21. This is not possible in Guthrie, because the fuel gas exhaust manifolds 732 must be provided at the top of the separator in Guthrie's configuration, while the oxidant gas exhaust manifold 612 is provided at the center of the separator structure (see Guthrie at Figure 10).

Claims 2 and 5-6 depend from claim 1, and are therefore allowable for at least the same reasons as claim 1. Furthermore, dependent claim 2 recites that *at least the top of said coolant flow field is inclined upwardly toward said air-releasing passage*. As recited in claim 2, the uppermost portion of the coolant flow field is inclined upwardly toward the air-releasing passage. The air in the coolant flow field moves smoothly toward the air-releasing passage due to the inclination at the top of the coolant flow field. Thus, the air is discharged from the coolant flow field into the air-releasing passage efficiently. The Examiner does not consider this feature in the Office Action. Accordingly, Applicants respectfully submit that a *prima facie* case of obviousness has not been established with respect to claim 2.

In view of the above, Applicants believe that the pending application is in condition for allowance and urges the Panel to pass the claims to allowance.

Dated: June 17, 2010

Respectfully submitted,

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